MEMO

DATE: November 2, 2006

TO: Transportation and Communications Committee

FROM: Philip Law, Senior Regional Planner Specialist, law@scag.ca.gov, 213-236-1841

SUBJECT: System Management at the Corridor Level: I-880 Example

SUMMARY:
The Transportation and Communications Committee will receive a presentation on the corridor system management plan currently being developed by Caltrans for the I-880 corridor in the Bay Area. The goal is to assess the lessons learned from the I-880 study as a potential template for staff to use in the evaluation of corridors in the SCAG region as part of the RTP development effort.

BACKGROUND:
The development of the corridor system management plan involves a detailed performance assessment of the corridor based upon data from various sources, including the Freeway Performance Measurement System (PeMS) and the Traffic Accident Surveillance and Analysis System (TASAS). Bottlenecks are then identified using PeMS, the Highway Congestion Monitoring Program (HICOMP), aerial photography, California Highway Patrol (CHP) logs, and other sources. To address the bottlenecks, different improvement scenarios are identified and evaluated using micro-simulation regional models.

Based upon this analysis, the plan will produce recommendations and performance improvement estimates. The concept of a system management plan is to develop comprehensive solutions that could include system monitoring and evaluation, intelligent transportation systems, incident management, and operational improvements, and not simply capacity expansion.

Reviewed by: *Division Manager*

Affirmed by: *Department Director*

California Department of Transportation

I-880 Corridor System Management Plan

An Illustration of the System Management Approach

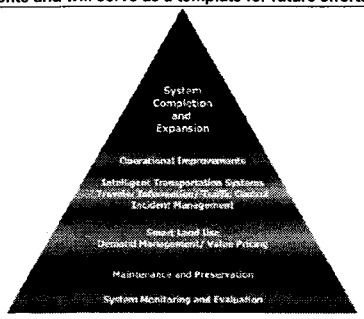
November 2, 2006

Agenda

- Project Overview
- Corridor wide performance
- Corridor bottlenecks
- Next steps

Project Overview

This study focuses on system management and all its components and will serve as a template for future efforts



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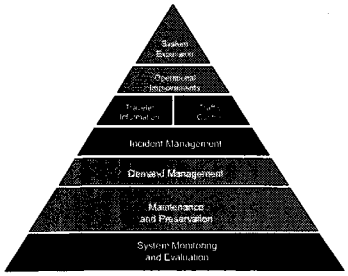
Note that the previous "pyramid" looks similar to the one included in the 2004 RTP



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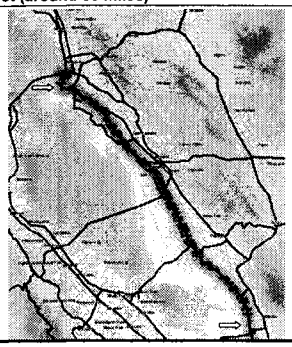
The corridor has good detection and stretched from SR-237 to 7th Street (around 35 miles)



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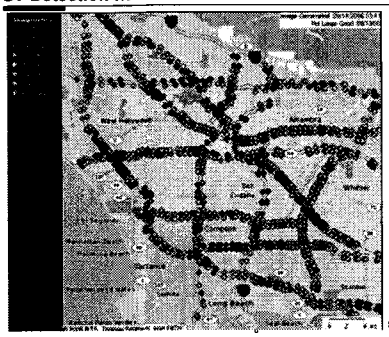
D7 Detection ...



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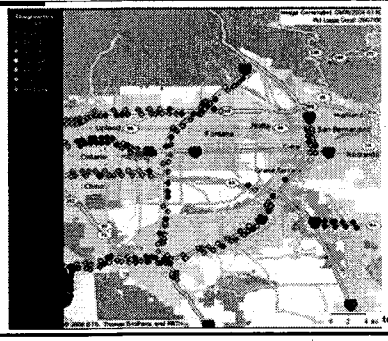
Riverside and San Bernardino (D8) Detection



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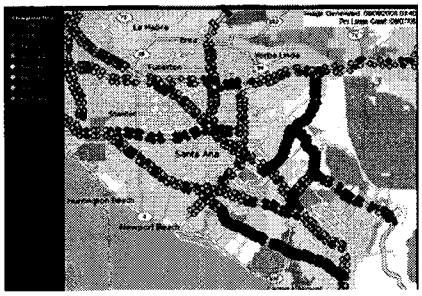
Orange County (D12) Detection



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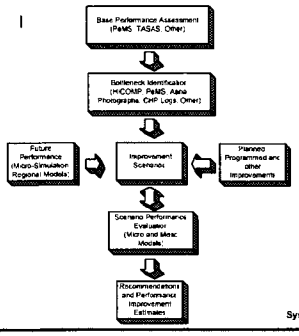
The approach focuses on detailed performance assessments and micro-simulation based "what-if" analysis



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Why Micro Simulation (despite its challenges)?

- Analysis of traffic flows
- Reasonable representation of queues and resulting traffic congestion
- Focus on bottlenecks
- Ability to analyze operational projects
- Integration of planning and operations
- Perhaps most importantly: Quantification of benefits due to operational strategies

Micro-simulation-based presentations/visuals are also more effective in discussions with stakeholders

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Corridor Wide Performance Assessment

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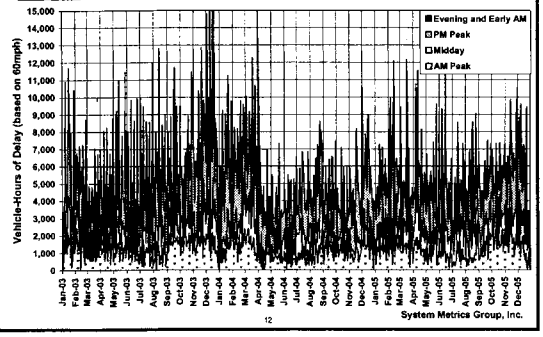
We used detection data to compute weekday delay on the study corridor over an 12-month period from January 2003 to December 2005 - Northbound



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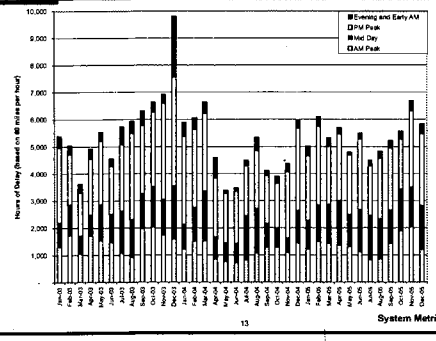
To better see the trends, we computed weekday averages by month (northbound)



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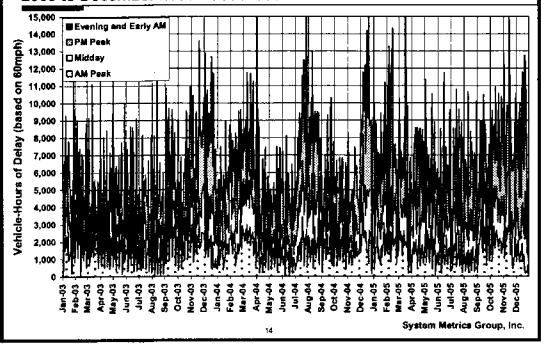
We also used detection data to compute weekday delay on the study corridor over an 12-month period from January, 2003 to December 2005 - Southbound



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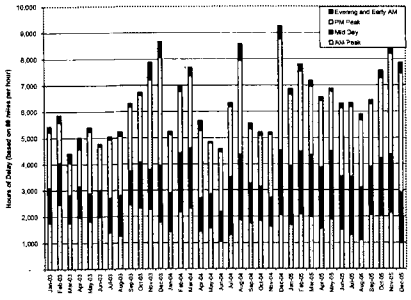
14

To better see the trends, we again computed weekday averages by month (southbound)



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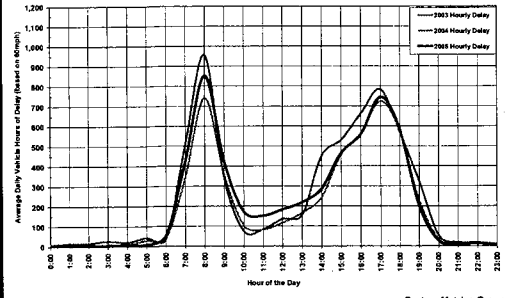
... and computed average delay by time of day for weekdays northbound



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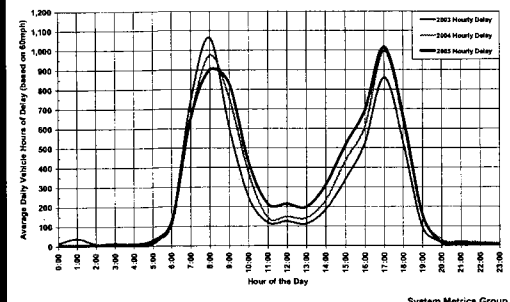
... and southbound



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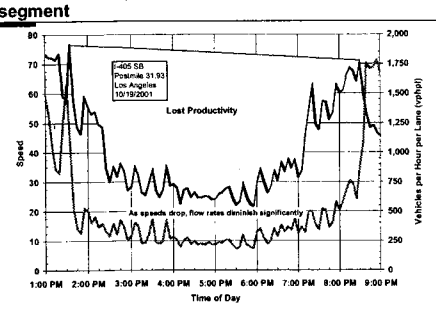
Detection also helps us calculate productivity losses by segment



Source: Performance Measurement System (PeMS) – October 2001
Vphpl: volume per lane per hour

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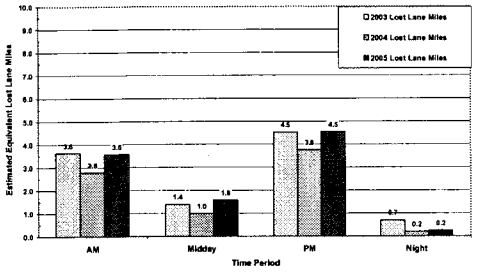
... which can be aggregated for the study corridor in terms of lost lane miles for different time periods (Northbound)



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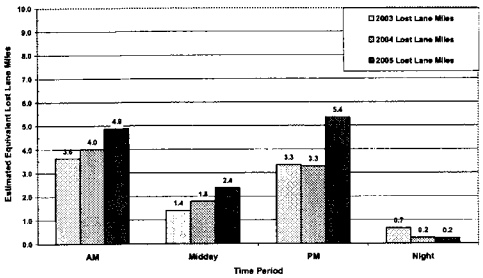
19

... which can be aggregated for the study corridor in terms of lost lane miles for different time periods (Southbound)



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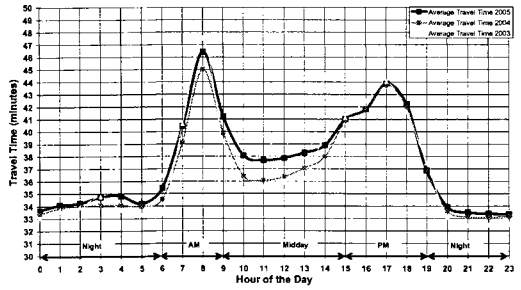
Travel times and trends are also computed for the entire corridor - Northbound



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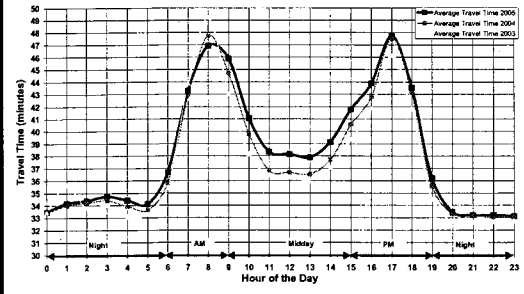
21

... and southbound



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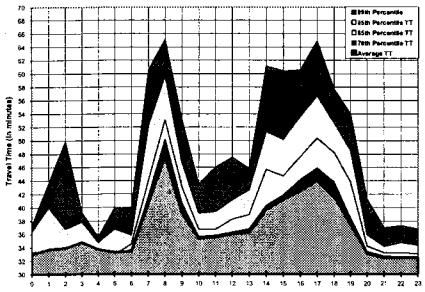
Travel time reliability is computed and shows how averages alone do not tell the whole story – Northbound 2003



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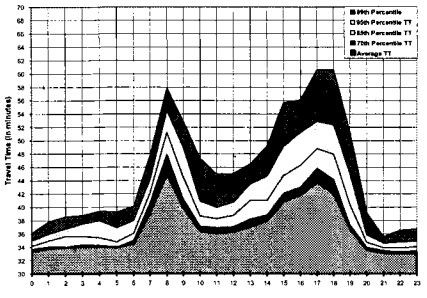
Northbound 2004



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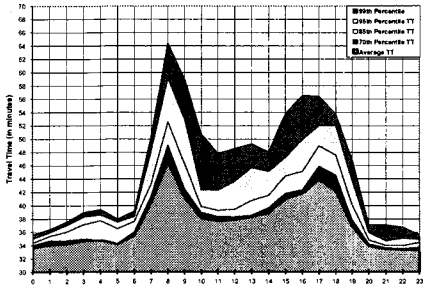
Northbound 2005



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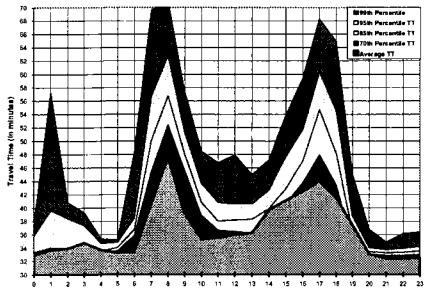
Southbound 2003



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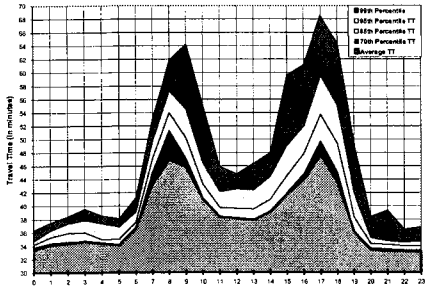
Southbound 2004



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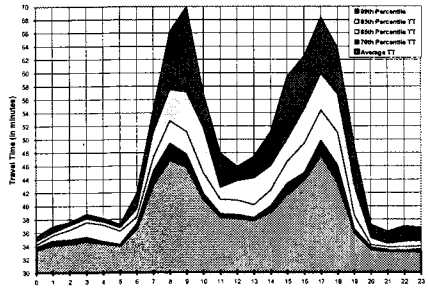
Southbound 2005



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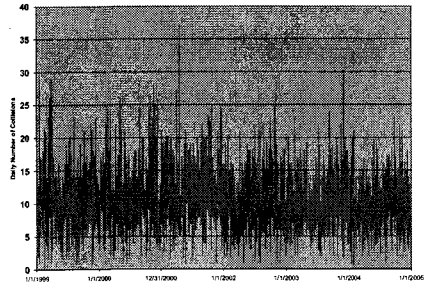
The Caltrans collision database shows that, over a four-year period, generally between 5 and 15 collisions occur daily... collision-free days are rare



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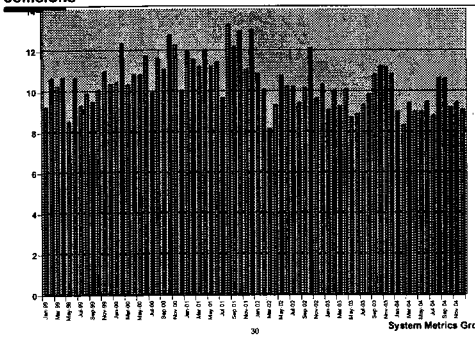
On the other hands, monthly averages show a downtrend in collisions



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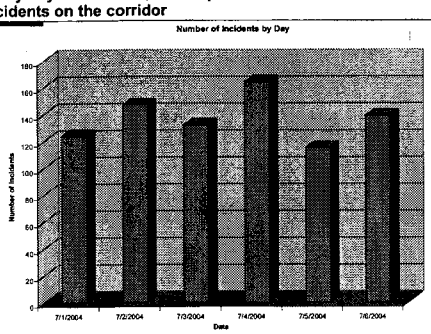
Every day of the week, CHP reports more than 100 incidents on the corridor



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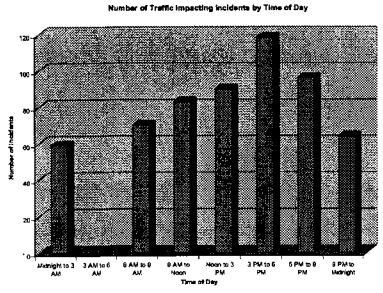
We identified the CHP reported incidents most likely to impact traffic, which represent about 70 percent of all incidents reported



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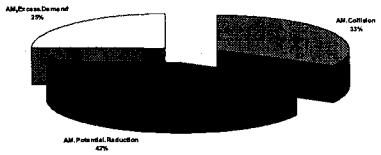
A preliminary UCB analysis of congestion by cause suggests that collisions cause about a third of total delay in the morning peak period ...



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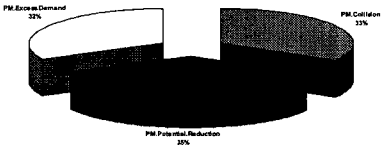
... and in the afternoon peak period



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Corridor Bottlenecks Identification and Analysis

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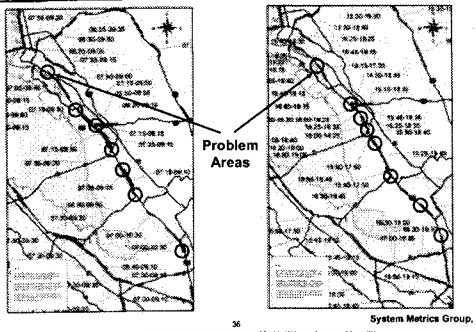
The 2003 Highway Congestion Monitoring Report (HICOMP) helped identify problem areas as a starting point



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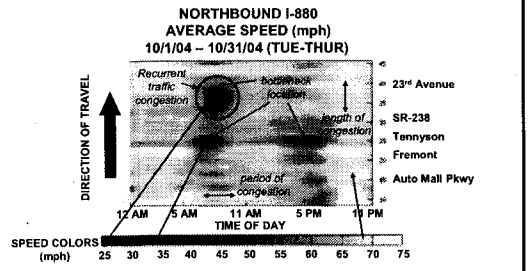
We then used speed contours helped clarify,the specific locations and extent of bottlenecks



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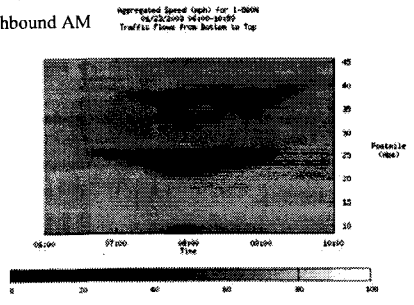
Bottlenecks change in severity from day to day

Northbound AM



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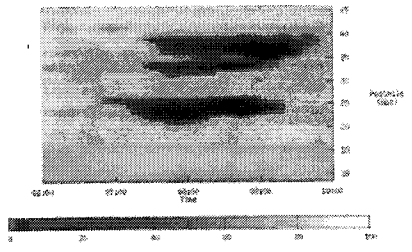
Northbound AM



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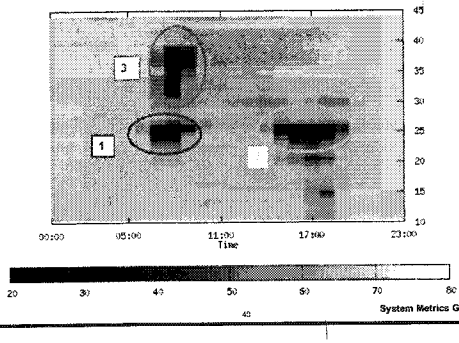
When reviewing the speed contours for the northbound direction (for October 2005), it appears there are three major bottlenecks (two of them in the same location at Tennyson and one at 23rd Avenue)



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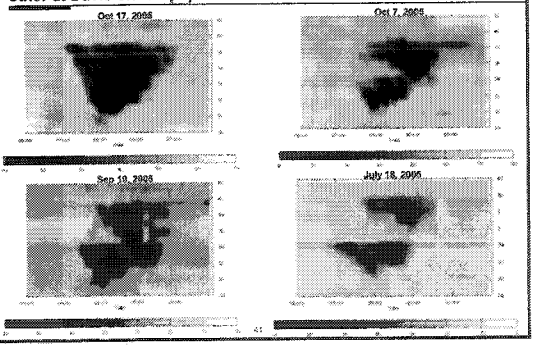
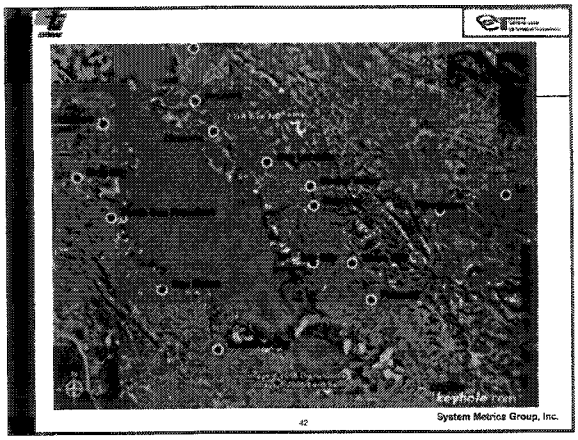
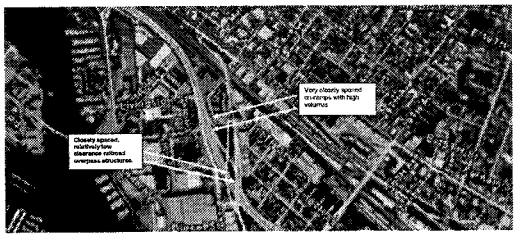
But upon more detailed review, the third dark area actually represents two separate bottlenecks (one at 23rd and the other at Davis on-ramps)

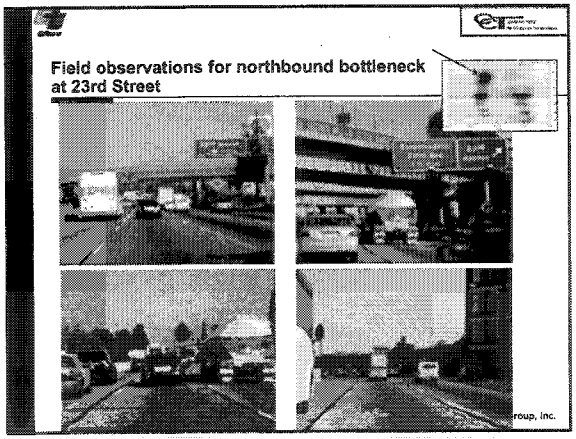


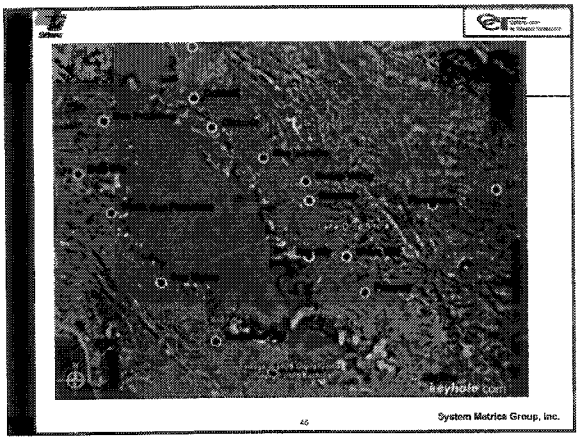


Aerial of 23rd Bottleneck



Field observations for northbound bottleneck at 23rd Street




keyhole.com
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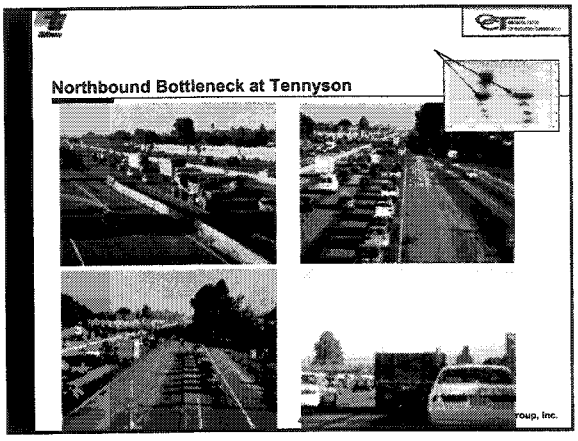
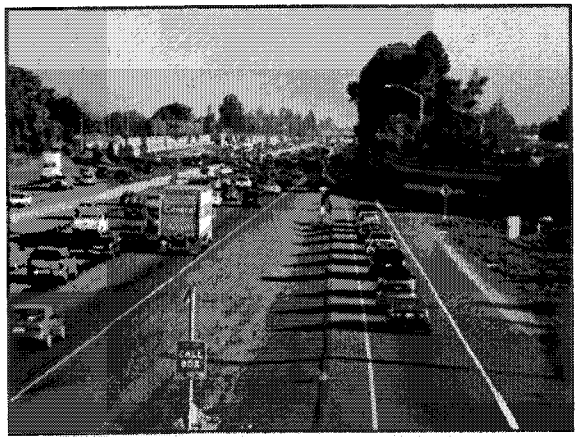
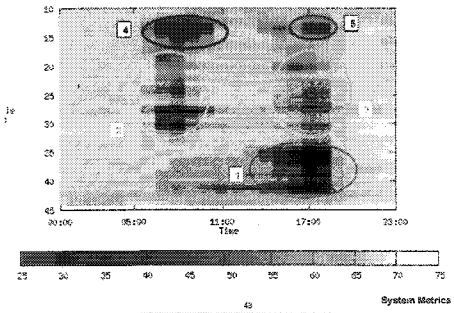

Northbound Bottleneck at Tennyson



Similarly, in the southbound direction, we identified fivebottleneck areas, two of which are at the same locations for both the AM and PM peaks (at different severities)



And identified likely causalities (example 98th bottleneck with two adjacent on-ramps with high peak volumes)

We then looked at the comprehensive list of projects proposed for the corridor and related each to the bottlenecks …

I = Indirect, D=Direct, N=Near Term, L=Long Term

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We have looked at the comprehensive list of projects proposed for the corridor and related each to the bottlenecks ...continued

Rte	PM Begin	PM End	Project Source	Project Description	Est Total Cost	Direct Indirect	Near or Long Term
880	22.83	22.83	T-2030 Committed/10 Yr SHOPP/Ala CTP Tier 1	I-880 Marina Blvd IC - replace overcrossing on I-880	$8.0	D	L
880	25.50	26.81	T-2030 Big Tent/Ala CTP Tier 1	Construct auxiliary lane on I-880 between Hegenberg Blvd and 66th St and shift merge point from Wb Hegenberg Rd to I-880 on ramp	$4.60	D	L
880	25.50	31.68	T-2030 Big Tent/Ala CTP Tier 1	I-880 modernization and ramp reconfiguration in Oakland as identified in the I-880 Safety and Operations Study	TBD	I	L
880	25.50	31.68	T-2030 New Commitment	I-880 from Hegenberg Rd to I-980 operational improvements (includes freight movement to Port of Oakland)	$20.0	I	N
880	28.0	28.0	T-2030 Committed	42nd Ave/High St access improvements to I-880 in Oak, includes widening and realignment of local streets, connector roads, and ramps near interchange	$15.8	I	L
880	28.69	28.69	T-2030 New Commitment	I-880/29th Avenue interchange safety and access improvements	$15.0	I	N
880	29.30	29.30	T-2030 Committed/RM II/Ala CTP Tier 1	I-880/29th Avenue interchange safety and access improvements	$15.0	I	N
880	30.38	30.38	T-2030 Committed	Reconstruct on and off ramps from NB & SB I-880 @ I-880/5th St IC	$20.0	I	L
880	30.38	30.38	T-2030 New Commitment	I-880/5th Ave ramp improvements	$20.0	I	L
880	31.09	31.09	T-2030 Big Tent	I-880 Oak St ramp reconstruction	$30.0	I	L
880	31.10	31.10	T-2030 Big Tent / 2004 10 year SHOPP	I-880 in Oakland - southbound Oak Street on-ramp - construct auxiliary lane	$1.8	D	L
880	31.20	32.80	T-2030 Committed	I-880/Broadway-Jackson interchange improvements (Phase 1)	$28.0	D	L
OFF	OFF	OFF	ALA CTP T 2030 commited	I-880/Davis St overcrossing	$10.7	D	I
VAR	VAR	VAR	T 2030 Big Tent	Freeway Traffic Operations Systems (TOS)	$255.0	D	N

I = Indirect, D=Direct, N=Near Term, L=Long Term

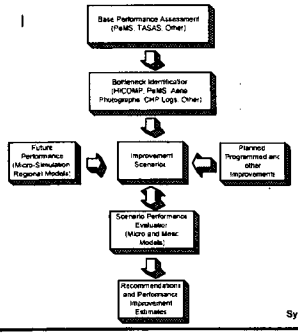
Transit projects cannot be directly evaluated by micro-simulation, but would be taken into account indirectly ...

Rte	PM Begin	PM End	Project Source	Project Description	Est Total Cost	Direct Indirect	Near or Long Term
OFF	OFF	OFF	T-2030 New commited/RM II/Ala CTP	BART-Oakland International Airport Connector	$254.3	T	T
OFF	OFF	OFF	T-2030 New Commitment	AC Transit Bus Rapid Transit (BRT) and Enhanced Bus, Phase 1: Telegraph Avenue/International Boulevard corridor	$167.0	T	T
OFF	OFF	OFF	T-2030 New Com / ALA CTP-Tier 1	Transit oriented development (including replacement parking) at MacArthur, West Oakland, and/or Coliseum BART Stations	$25.0	T	T
VAR	VAR	VAR	T-2030 Committed	AC Transit bus corridor improvements	$20.0	T	T
VAR	VAR	VAR	T-2030 Committed	Capitol Corridor intercity rail service (track capacity/frequency imp. from Oakland to San Jose designed to allow 18 daily round trips between Oakland and Sacramento/San Jose)	$158.0	T	T
VAR	VAR	VAR	T 2030 Committed/ RM II	RM II Express Bus North Improvements (includes park and ride lots and rolling stock)	$10.5	T	T
VAR	VAR	VAR	T 2030 Commited/ RM II	RM II Express Bus North Improvements (includes park and ride lots and rolling stock)	$18.0	T	T

T = transit

Next Steps

Next steps will focus on testing the scenarios developed specifically to address the bottlenecks identified and develop a phased implementation plan



System Metrics Group, Inc.

Questions?

System Metrics Group, Inc.